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21 May 2014

Version of attached file:

Accepted Version

Peer-review status of attached file:

Peer-reviewed

Citation for published item:

Bracken, L.J. and Oughton, E.A. (2014) 'How to make sense of our rivers : using assemblage to understand angling.', Wiley interdisciplinary reviews : water., 1 (3). pp. 315-322.

Further information on publisher's website:

<http://dx.doi.org/10.1002/wat2.1025>

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How to make sense of our rivers: using assemblage to understand angling

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Abstract

Our freshwater habitats are under threat and governance of these systems is rapidly evolving. It is thus important to examine how we make sense of our rivers and how this understanding can underpin catchment management. Assemblage is one approach that can be used to understand our freshwater environments. In this paper we reflect on an interdisciplinary project on angling to evaluate whether using assemblage may help us comprehend our rivers in new ways. We work through themes of: different perspectives of river processes, what constitutes evidence used in decision making, how the nexus between wildlife and the physical environment plays out, and the importance of rivers to our well-being. We demonstrate how assemblage can facilitate a deeper and more comprehensive understanding of relational processes and how these evolve over time. Assemblage can thus be used as a way of exploring rivers to support integrated management within complex systems of governance.

Keywords

Assemblage; relational; interdisciplinary; angling.

Introduction

Freshwater habitats are one of the world's most threatened ecosystems (1) and so the use and management of these habitats has become a critical focus for research (2). Yet, regulation and governance of rivers is dynamic and the ways in which management takes place in practice is continually being negotiated and constantly evolves (Side Bar 1;3;4). It is thus important to examine how we make sense of our rivers and explore whether an assemblage approach can help us understand our rivers in new ways (5). Angling offers an ideal case to investigate the interrelated processes in the riparian environment and economy because the institutional arena within which governance of the river environment is played out is complex, dynamic and fragmented (Side bar 2) (6;7).

Relational approaches have underpinned recent studies of the water and riparian environments (8;9;10). Actor Network Theory (ANT) has underpinned much of the relational research, treating objects as part of social networks (11;12). ANT explores the combinations and interactions of elements within social networks by focusing upon both material and conceptual attributes simultaneously (11;13;14). Existing research using relational theory to explore the environment has highlighted the disjuncture that often occurs between understanding the way in which natural processes work and the social structures and power relations that are already established to manage the environment (e.g. 15). As Bear notes ANT focuses on 'what is required' and tends to take a reflective approach to examining events which have already occurred (12; p24).

Assemblage goes further than ANT and has been described as a descriptor, an ethos and a concept (5;16;17). This way of thinking has emerged through an interdisciplinary approach to a socio-technological world.

...assemblage functions as a name for unity across difference, i.e. for describing alignments or wholes between different actors without losing sight of the specific agencies that form assemblages. Assemblage appears as a specific form of relational thinking that attends to the agency of wholes and parts, not one or the other. (18:162)

The added value of working with assemblage is that it embraces the way in which relational processes vary spatially and temporally and hence can enable researchers to appreciate the way in which relations continue to develop and how issues/relations may emerge in the future. As Bear notes, 'the assemblage approach is more likely to emphasize what is possible' (12; p24), rather than only interrogating the actors and processes that enabled a system to reach a certain point in time. Angling as a recreational activity is an assemblage, both as a 'thing' (a noun) and an act (a verb). For us assemblage is exciting as it goes beyond relational analysis and embraces the dynamic messiness of what may appear on the surface as a relatively simple network of activities (19). Moreover, assemblage thinking recognises that the dynamic messiness is more than the sum of its parts (18). Angling is composed of materials, involves both humans and non-humans, and the activity links many processes and institutional contexts. A significant aspect of these relations is their dynamism and complexity and the non-directional nature of processes.

Thinking with assemblage has implications for how we practice research around water resources and underlines the importance of thinking differently about catchment management (e.g. 8;9; 10;20;21). The purpose of this paper is to show how working with assemblage can enhance our knowledge about angling as a socio-environmental process. As such an interdisciplinary research approach to the study of angling is demanded prior to any intervention made through changing policy or management practices. Any attempt to disentangle the assemblage (such as in traditional approaches to research) leaves what is left behind as much less than the assemblage's whole. Working with assemblage may provide a new way to link social and natural science epistemologies to support novel and more comprehensive understandings of water. In this paper we start with a brief outline of the case study: angling in the rural environment, before exploring in more depth the interplay of interdisciplinarity and assemblage. We go on to discuss the implications of our findings for both the users of our research and more widely for the research community.

Side Bar 1: Policy response through Catchment Based Approach (CBA) in the UK

In February 2011, the UK Government signalled its belief that more locally focussed decision making and action should sit at the heart of the debate about the future direction of improvements to the water environment to meet the Water Framework Directive. The objectives for the CBA are:

- i To deliver positive and sustained outcomes for the water environment by promoting a better understanding of the environment at a local level; and
- ii To encourage local collaboration and more transparent decision-making when both planning and delivering activities to improve the water environment.

Adopting the approach will promote the development of more appropriate River Basin Management Plans, but will also provide a platform for engagement, discussion and decisions of much wider benefits including tackling diffuse agricultural and urban pollution, and widespread, historical alterations to the natural form of channels.

A number of pilot catchment initiatives were undertaken in 2012 to develop thinking and identify elements of good practice needed to support wider adoption. DEFRA (UK) has made £1.6M available in 2013/14 to support establishing functioning catchment partnerships. It is hoped that this funding will lead to longer term commitment to ensure the catchment partnership is sustainable.

Side bar 2: Background to angling

The Environment Agency for England and Wales¹ has argued that angling has environmental, social and economic benefits. It has been estimated that angling has increased since 2000 and the income in 2008 from fishing licenses was more than £23 million and the value of household income created to be approximately £1 billion (22). Similarly the social benefits of angling, largely based on work done by organizations such as Get Hooked on Fishing, have demonstrated angling as a cost-effective way of tackling antisocial behavior and underachievement in young people. The EA also views anglers as the 'eyes and ears of the water environment' and '...an important interest group for a better and protected environment' (23).

There are however contradictions that accompany any expansion of angling. Individual anglers focus on intrinsic values – it is good to go fishing – but institutions may focus on instrumental values such as economic expansion, resulting in more anglers on a body of water having less enjoyment. Angling is intensely individualistic and diverse, but to get support from government it needs organized representation to speak with one voice. Or the expansion of angler numbers may degrade habitats and increase handling of fish and the introduction of non-native species.

2 The case study: Angling in the rural environment

Our research project grew in response to the Environment Agency's proposition that angling was good for the river environment, the local economy and personal well being (7). The overall aim of our project was to analyse the complex network of natural and socioeconomic relationships around angling in the river environment, including institutions of governance and land use practices at a range of interconnected scales. The project drew upon research into rural economic and social development, aesthetics of the environment, geomorphological processes and biodiversity conservation. We investigated key intersections within the practice of angling in three river catchments; the Rivers Swale, Esk, and Ure in North Yorkshire, UK. These catchments offer a range of fishing practices, land uses, problems of siltation, and species, and come under the remit of several environmental agencies. The catchments of the Swale and Ure are rural but lie within 50 km of several large centres of population (Leeds, Bradford, York, Middlesbrough and Darlington). The Esk catchment is mainly open moor land and pasture.

We used a range of methodologies to collect primary data, from participant observation, working on river banks and with EA officials, through semi-structured interviews, questionnaires, field experiments and computer mapping. Using such an interdisciplinary and multi-method approach enabled the research team to cover a range of issues. These included; developing a protocol to identify suitable sites for releasing hatchery reared juvenile freshwater pearl mussels (24); a detailed examination of upland channel truncation in the UK which included the nuanced processes of negotiation associated with environmental decision-making and social interaction around rivers (4); developing an understanding of wellbeing associated with the social and natural relationships of a rural angling culture (25) and an exploration of the relationships between anglers and the river

¹ The Environment Agency (EA) is responsible for the implementation of UK government policy on rivers and the water environment in England and Wales.

environment (10;26). The purpose of this paper is not to reproduce already published work, but rather to use the existing research to examine how we understand our rivers and implications which emerge for future research.

3 Angling: an assemblage in practice

3.1 Where to start?

A very pragmatic decision at the start of any project concerns framing (27;28). By its nature an assemblage approach is in contradiction to bounding a research project. Anderson et al., (17) point out that in some subjects, such as ecology, art and archaeology, the form of associations are already delimited by taxonomic criteria. Yet, they argue that the starting point of an assemblage based analysis of the social is *'to understand assembling as an ongoing process of forming and sustaining associations between diverse constituents'* (17:174). We agree; boundaries are arbitrary, current, fluid, and porous and yet to undertake a project, from both an administrative and intellectual point of view the focus and boundaries of a project must be addressed. Li (2007) suggests that the practice of working with assemblage includes both *'forging alignments'* (linking the objectives of the parties involved, who is involved and who is affected) and *'rendering technical'* (extracting a set of relations in which the problem and the intervention is identified (20;p265). Both of these elements are embraced in framing a research project.

At the outset we developed a practical approach to our research process. We saw the central relationship within the assemblage as that between fish and angler and initially moved out from that point to include the significant relationships within multiple social, economic and physical environments until we reached the limit of our resources. This was an iterative process employing the diverse knowledges and expertise of the research team both academic and non-academic. A second limit was defined by the institutional requirements of the non-academic partners and stakeholders. Importantly, we remained reflexive and flexible in our attitude to the 'boundary' throughout the research and the project evolved to explore the assemblage as previously unseen aspects were revealed and external relations changed. A study engaging with assemblage has to be interdisciplinary to enable the essential conversations from very different research expertise and perspectives, necessarily integral to the project (19;29). By following the fish the alignments forged and the way in which the relations were rendered technical emerged through the assemblage, not by disciplinary trainings or pre-held perspectives of researchers and partners. New ways of thinking and exploring the water environment thus emerged, rather than being specified at the outset of the research. The active participation of stakeholders maintained a focus on the practical implications throughout. Using assemblage to understand angling enabled five significant themes to emerge. Here we outline five themes and illustrate how working with assemblage was crucial to the outcomes.

3.2 Understandings of the freshwater environment and management practices.

An assemblage ethos enabled the project team to expose differences in understandings brought to relationships around angling and hence to inform the sustainable management of rivers. Perspectives differ because they are held *by* different people, for instance key stakeholder organisations and individuals. The qualities of the observer, and the observation, are formed by the breadth and depth of the observer's experiences and intentions through the act of observing. For instance, we found that anglers' understandings, were primarily formed through 'watercraft', the cultural and bodily learning of how to fish (30). This included making sense of the river through visual senses, but also through touch and technology that extended the body's own senses underwater. Many anglers keep records of what they catch, and also of water temperature, weather

changes, and how changes affect fish behaviour, a form of 'lay phenology' that could be exploited more substantially (10;30;31). The observations recorded by anglers are valued by official bodies, which invite angler representatives to sit on management committees. This recognises that anglers' understandings are important. But it can also be used to legitimate regulation or ease the passage of unpopular measures by co-opting anglers (21;26).

In this situation the character of assemblage was critical to understanding such complex and rapidly evolving situations. Li (2007) noted that '*authorizing knowledge*' (specifying and critiquing the requisite body of knowledge), '*managing failures and contradictions*' and '*anti-politics*' (reposing political questions, breaking down knowledge hierarchies) are also elements of using assemblage. The examples given above show how the elements identified by Li were crucial to not just examining past relations that have led to current practice, but empowered researchers to appreciate the way in which relations continue to develop and how issues/relations may emerge in the future.

3.3 The nature and role of evidence in the development of angling and freshwater ecology.

'*Authorizing knowledge*', '*managing failures and contradictions*' and '*anti-politics*' were important aspects of the processes of determining evidence in angling and freshwater ecology. Counting anglers shows the difficulty of identifying anglers and the implications of these difficulties. Quantifications of anglers can be found in conversations, policy documents, press releases and the literature produced by angling organisations. Thus: i) Sport England (2006) reported that there were 280 000 anglers; ii) the EA sold 1.3 million rod licences in 2005; and iii) the EA stated that 4.2 million people had been fishing in 2004-5. Each estimate is portrayed in the literature as 'a fact', helping to demonstrate the importance (or unimportance) of angling and justifying (or otherwise) financial input from Government. In two of the cases, the reports include methodologies, suggesting rigour. However interviews with anglers and people working in the EA suggest that counting of anglers presents a case of an overtly political process where the numbers are used to influence the funding of angling.

The second example is decision making to conserve the freshwater pearl mussel, a protected species, in the River Esk (3). The lifecycle of the pearl mussel is entwined with that of salmonids and linked to land use practices via catchment processes that deliver water, sediment and nutrients to the fluvial system. Over the past 15 years there has been growing concern over the pearl mussel in the Esk. Concern on the part of the EA led to the commissioning of a census of the freshwater pearl mussel in the river which revealed very low numbers. Later, repeat surveys, using a different methodology and drawing on local knowledge of the river revealed much larger numbers (although not a sustainable population). The response to the initial census data was a strengthening of the focus on sediment deposition which had been identified as the key factor causing low numbers. This mapped on to the opportunity provided by the Catchment Sensitive Farming initiative to reduce sediment transfer to the river. The methods used in the surveys of the river and the omission of local knowledge contributed to the considerable inconsistencies in the data collected. Furthermore, it became clear that sediment was not the only contributory factor. Local informants had pointed this out earlier, but it was only at a later date that the committee set up to help the recovery of mussel numbers decided to investigate the water quality to fill gaps in the evidence. The data demonstrated nitrate concentrations at levels greater than those suggested elsewhere for sustaining pearl mussel populations.

In section 3.1 we noted that 'forging alliances' and 'rendering technical' were important aspects of assemblage in developing a project. The examples in section 3.3 demonstrate how assemblage allowed researchers to let the actors, their perspectives and the issues emerge. What also comes to the fore is how the requisite body of knowledge emerged and how we were able to extract a set of

relations in which the problem and the intervention were identified. The nexus between how wildlife exists and how management has developed (15) is also present in the examples above. These illustrations highlight a number of issues about the role of evidence in managing the river environment. All data were used as though reporting the 'truth' about river characteristics, but it was never fully contextualised. In this way decision making conformed to models of technocratic rationality and physical science data was treated as unquestionably legitimate. Decisions were controlled and taken by people regarded as experts. In contrast lay knowledge was not seen as evidence. The failure of practitioners to appreciate dynamic relational aspects of the project over time limited the value of these data as evidence from which to develop the management of rivers for angling.

3.4 The organisation of planning and communication about angling.

Understanding how a system works, managing the system in response and being aware of the complexity requires good communication. Fish, fisheries and anglers communicate at a variety of scales. Analysis of the empirical data demonstrated that the organisations involved in angling sometimes struggled to communicate effectively across different levels within and between organisations. We witnessed the concentration of pressure from the government to identify a single voice to represent anglers that drove a radical restructuring of the organisational governance of angling. This provided the creative opportunity that Lane et al., (2013)(32) describe to remake assemblages in alternate ways. The relational processes of the assemblage changed dramatically on paper, but the practices of the different actors as clubs and individuals followed more slowly. After much negotiation the Angling Trust was launched in January 2009. However, angling is an intensely individual activity and in the absence of a perceived threat to the practice of the sport meant that less than 2% of anglers had joined by early 2011.

A challenge that invites further engagement is the way in which 'local' appears and is relevant to assemblage in this study. Spaces are fluid. Rivers flow through particular locations; plants and animals may or may not move; and sediment and river materials flow or are deposited in particular places. What is more, 'local' knowledge, built from experience of living in a place or fishing in a place over and extended period of time, is also dynamic and evolving. In the most prosaic examples: anglers don't wish to stock young fish because they can swim away or be washed away in high flows; similarly, anglers may belong to local clubs and 'know' the waters very well. However, clubs have arrangements with each other to swap or loan fishing days and anglers may fish many miles from their home stretch. 'Local' knowledge thus becomes highly problematic, as the people fishing a stretch of river might not be those who live closest to it. We have not explored these issues in any depth, they do however illustrate the potential of assemblage theory to contribute to understanding practices around the river.

3.5. Commercialisation of angling and sustainable development – some management implications

Exploring the changing institutional nature of angling brought into focus the changing variety and quality of relationships between angler and fish, fish and water and angler and water. Some of these evolving interactions were focussed around the commercialisation of angling opportunities. The relationships formed and reformed were heterogeneous at a variety of scales and causality flowed in both directions. Recent years have seen a shift from river angling to still waters and from anglers as club members to market consumers of angling as a commodity. Commercial still waters are in part replacing club still waters by providing out of season angling at lower costs in both money and organisational time (33).

However, the growth of still waters brings with it risks to freshwater catchments from stocking (including non-native species), fish movements and disease outbreaks (34). We found from a survey of 404 still waters that in the Swale and Ure catchments, 80% of still waters inhabited by fish contained at least one non-native fish species, with carp being the most common. Although movements of fish and shellfish are strictly regulated to minimise risks of spread of disease and non-native species, we found evidence of a lack of due care and in some cases wilful neglect of regulations. The high frequency of sites with stocked fish and the proximity of a substantial number to watercourses suggest that loss during flood events and consequent spread of non-native fish stocks may be a bigger problem than some within the EA perceive.

3.6 Wellbeing and the sustainability of angling

There are a large number of additional, non-catch, motivations and satisfactions associated with angling and a continued commitment to the sport that we found associated with the development of wellbeing amongst anglers. These findings are unlikely to have resulted from a more traditional approach to studying a single activity. The reported behaviour of anglers fell into three categories which together comprise a relational economy of well being (35;36). The first category is behaviour in the relation to rivers, fish and the wider natural environment. Anglers learn and develop skills of river craft which are important to all three (30). The second sees angling as complementary to health, work and family in the promotion of flourishing; the main emphasis within our study was on mental rather than physical wellbeing. The final category is the social reproduction of angling through learning to fish. Passing on skills was often associated with social and family networks, the camaraderie of fishing and the commitment to passing on skills was highly valued. This feature is of clear social value to those participating (25).

Our results show that wellbeing derived from angling is based on the value placed on a sustainable future commitment, whether to building respect for the environment, to the welfare of fish or passing on skills to others. It is these aspects which illustrate the usefulness of assemblage thinking: a dynamic, rethinking of social relationships that includes learning and reorganising relations. The well being derived from the type of angling found in North Yorkshire is not based on immediate gratification, but on a relational leisure economy and so is unlikely to be fully measured using narrowly economic proxies such as income or expenditure (c.f.37)

4. Conclusions

In this paper we have explored whether use of assemblage can help us understand rivers in ways that embrace their many roles. A number of substantive findings emerged from our study of recreational angling that have been published to inform academic research and underpin stakeholder management around angling. But here we want to emphasise how using assemblage enabled us to make sense of water environments differently. Our review of the significance of assemblage as an approach to researching complex socio-technical systems demonstrates some of the strengths of this way of thinking. We explored the alignment of different actors and processes and have shown that the assemblage is a product that is larger than the sum of its parts. We have argued that the lively nature of the situation requires a view that accommodates change and fluctuations in relations, the focus on process draws attention to the socio-temporal dynamics operating throughout the river environment.

Assemblage theory brings to the fore the social complexity of environmental systems, broadening activities from purely instrumental: technocratic or commercial, to incorporate many more of the actors engaged in the system, material and non-material, 'expert' and lay. Through an interdisciplinary approach, that incorporated stakeholders beyond the academic, we embedded

different perspectives around a relatively simple, focused activity. We have shown how this has facilitated a deeper and more comprehensive understanding of relational processes and how these evolve over time. We have given examples of: what constitutes evidence of decision making, how the nexus between wildlife and the physical environment plays out, and in so doing been able to re-visualise ways to better manage rivers.

Physical sciences have been slow to engage with assemblage as a way of thinking in the sense in which it is used in this paper. We have shown here that an interdisciplinary project that engages with both natural and physical sciences and the spaces between them may provide a more insightful and robust interpretation of the world. Thus using assemblage can enable novel understandings of rivers to emerge which can be used to support integrated management within complex systems of governance which is necessary to meet multiple and competing demands from people, wildlife and the wider physical environment.

Acknowledgements

This paper draws on ESRC funded research undertaken in the Angling in the Rural Environment project (award RES 227 25 0002). We thank our co-workers on the grant; we have drawn on their ideas and conversations. We also thank all the anglers, scientists and professional managers involved in the empirical research.

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